

CLAIMS

1. A pneumatic structural element

- comprising an elongated airtight hollow body (1) that can be impinged upon by compressed air and is made of a flexible material,
- comprising at least one compression rod (2) which along a surface line of the hollow body (1) rests against said hollow body and is secured against displacement and buckling, furthermore
- comprising at least one pair of traction elements (4) which are attached to the two ends of the compression rod (2), of which there is at least one, for which purpose each end of the compression rod (2) has a knot (3) for mutual non-positive attachment of compression rod (2) and traction elements (4) and for taking up bearing forces, wherein furthermore the two traction elements (4), of which there are at least two, in at least one turn are helically placed around the hollow body (1) in opposite directions and intersect on a surface line (7) of the hollow body (1), which surface line is opposite the compression rod (2), characterised in that
- means are provided by which at least one of the operating parameters of pressure in the hollow body (1), length of the compression rod (2), or length of the traction elements

(4) can be altered pneumatically, hydraulically or mechanically.

2. The pneumatic structural element according to claim 1, characterised in that

- means are provided by which the length of the compression rod (2) can be altered pneumatically, hydraulically or mechanically.

3. The pneumatic structural element according to claim 2, characterised in that

the length of the compression rod (2) is altered by means of one of the following actuators (11) or actuator units (12), namely by means of:

- a pressure bladder subjected to pressure
 - or a hydraulic cylinder
 - or a pneumatic cylinder
 - or a lead screw
 - or a rack and pinion combination;
- or in conjunction with force reversal by means of
- a pneumatic artificial muscle
 - or a cable drive
 - or a chain drive;

or by means of a linear actuator unit (12) which by means of two locking devices (10), which can be operated in turn, on both ends of a linear actuator (11), can overcome multiples of the maximum regulating distance of this linear actuator (11).

4. The pneumatic structural element according to claim 1, characterised in that

- means are provided by which the length of the traction elements (4) can be altered pneumatically, hydraulically or mechanically.

5. The pneumatic structural element according to claim 4, characterised in that

the length of the traction elements (4) is varied by means of one of the following actuators (11) or actuator units (12), namely by means of:

- a pneumatic artificial muscle
- or a cable drive
- or a chain drive
- or a lead screw
- or a rack and pinion combination;

or in conjunction with force reversal by means of

- a pressure bladder subjected to pressure
- or a hydraulic cylinder
- or a pneumatic cylinder

or by means of a linear actuator unit (12) which by means of two locking devices (10), which can be operated in turn, on both ends of a linear actuator (11), can overcome multiples of the maximum regulating distance of this linear actuator (11).

6. The pneumatic structural element according to claim 1, characterised in that

- means are provided by which compressed air can be supplied to, or removed from, the hollow body (1).
7. The pneumatic structural element according to claims 1 to 6, characterised in that
- sensors for measuring the variable operating parameters of interior pressure in the hollow body, length or stress of the compression rod (2) or length or stress of the traction elements (4) are present, as well as in that
 - an electronic control and regulating device is present.
8. The pneumatic structural element according to claims 3 and 6.
9. The pneumatic structural element according to claims 5 and 6.
10. The pneumatic structural element according to claims 3, 5 and 6.